

## REMARKS

This is in response to the Office Action dated November 9, 2004. In view of the foregoing amendments and following representations, reconsideration is respectfully requested.

Initially, on pages 2-3 of the Office Action, claims 11, 17 and 23-30 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 9, 11, 12, 14, 16 and 17 of copending Application no. 10/009,690 in view of Foye (U.S. Patent No. 3,556,197). In the explanation of the rejection, the Examiner indicates that the claims share identical elements.

Accordingly, each of the independent claims in the present application have been amended to remove the common limitation of the insulating plate. This feature, as claimed in the copending application, is not shown in the prior art. Thus, it is submitted that obviousness double patenting rejection should be withdrawn because each of the independent claims in the present application recites subject matter that would not have been obvious over the claims in the copending application.

Next, on pages 4-9 of the Office Action, claims 11-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kittilsen (U.S. Patent No. 5,915,455) in view of Foye (U.S. Patent No. 3,556,197). Also, claims 11-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Naess, Jr. et al. (EP 0 337 769) in view of Foye. These rejections are respectfully traversed for the following reasons.

**Kittilsen et al.** discloses a horizontal casting apparatus provided with a mold including a primary water-cooling circuit 11 and a secondary water-cooling circuit 12. In

the primary water-cooling circuit 11, water passes through the mold without directly contacting the magnesium. The water from the secondary water-cooling circuit 12 is sprayed through slots or nozzles 18 directly onto the magnesium hitting the metal at an angle of about 30-35°.

The mold also has an oil ring 19 formed of metal with channels 20 for supplying oil to lubricate the mold. Reference numeral 21 denotes a transition ring of insulating porous refractory material at the inlet of the mold through which a protective gas is supplied from channels or gas supply passages 22. The molten metal will solidify at the point denoted by reference numeral 25. The protective gas is supplied to the molten metal prior to solidification in order to prevent discoloration. Thus, the gas does not provide any lubricating effect in the mold. The oil is supplied at the solidification point 25 to lubricate the mold.

In the magnesium casting art, one of ordinary skill in the art would have recognized that a protective gas has to be used because magnesium is highly reactive with air. However, a person of ordinary skill in the art of horizontal casting would not be motivated to add any protective gas when casting other metals, such as iron or aluminum. These metals do not cause problems due to contact with air. Thus, the supply of a protective gas to such equipment would be unnecessary and would complicate the construction of the mold. Therefore, it is submitted that the proposed combination of Kittilsen and Foye would not result in the use of a combination of oil and gas as a lubricant.

**Foye** describes an apparatus for horizontal casting where oil is supplied as a lubricant through a capillary gap 37. However, Foye does not disclose or suggest any

supply of gas. It should furthermore be noted that the oil supplied in the Foye apparatus is led through conduits 32 into depressions 31 in the mold section 30. The depressions 31 are covered by a gasket 35 with slots 36 corresponding to each depression 31. The oil will flow from the depressions through the slots into the gap 37.

Accordingly, Foye discloses a mold with a plurality of depressions in the mold housing into which oil is supplied. The oil is thereafter led, through slits in the gasket, into the mold cavity. The apparatus according to Kittilsen is provided with one oil ring 19 for supplying oil to lubricate the mold. It is not clear how collective teachings of the applied references can result in a casting apparatus in which a plurality of restricting elements form a plurality of sectors through which oil and gas can be led separately as required in claims 11 and 17 of the present application.

As admitted by the Examiner, Foye does not disclose physical restrictions between the slots 36 in the gap 37. These structural features are expressly required in independent claims 11 and 17.

Clearly, neither of the Kittlesen or Foye references discloses an annulus (annuli in claim 11) divided into sectors by restriction members. Accordingly, since Foye does not disclose the claimed sectors, it cannot be said that this reference suggests the modification of Kittlesen to contain that feature.

In each of the grounds of rejection, the Examiner takes the position that:

“One of ordinary skill in the art would have recognized that the plugs or similar restrictions, as the applicants’ claim, would be analogous to the plurality of valves taught by Foye, as in each instance the supply of oil would be “differentiated” around the circumferences of the mold cavity in controlled amounts and pressures at predetermined location (abstract; column1, lines

12-18 and 41-59; column 3, lines 27-42 and 66-75; and column 5, lines 1-19 and 56-58)."

Applicants have carefully reviewed the textual passages cited by the Examiner, and

- can find nothing that discloses the particularly claimed features of claim 11 or claim 17.
- The cited text does describe a similar purpose, i.e. supplying different amounts of lubricant about the interior mold surface. However, the actual structure employed in Foye is significantly different from that required in claims 11 and 17 of the present invention. Recognizing this, the Examiner simply dismisses the structural limitations of the independent claims by determining that the Foye valves 11, 26 are ***analogous*** to the physical structure employed in the present invention. However, concluding that a prior art apparatus is "analogous" is not a proper basis for an obviousness determination. Applicants are aware of no legal precedent that would support the Examiner's position. The fact that the present invention and the prior art reference are directed to similar problems does not render the specially claimed structure of the present invention obvious.

Further, as previously discussed, **Naess** does not provide a solution to the problem of providing a differentiated supply of oil and gas in the mold. A person of ordinary skill in the art of vertical casting would have known that the gas will become entrapped in the metal if used in a conventional horizontal casting apparatus, and therefore would not have been motivated to modify the Naess apparatus in view of the teachings of Foye.

In view of the above, it is submitted that the present application is now clearly in condition for allowance. The Examiner therefore is requested to pass this case to issue.

In the event that the Examiner has any comments or suggestions of a nature necessary to place this case in condition for allowance, then the Examiner is requested to contact Applicant's undersigned attorney by telephone to promptly resolve any remaining matters.

Respectfully submitted,

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